

CARDIO CARE



CARDIOVASCULAR RESEARCH INSTITUTE • UNT HEALTH SCIENCE CENTER AT FORT WORTH • VOLUME 2, NUMBER 1 • MARCH 2001

Executive Committee

Peter B. Raven, PhD
Director

James L. Caffrey, PhD
Associate Director

Dan Dimitrijevič, PhD
Division of Cell & Tissue
Engineering

H. Fred Downey, PhD
Division of Cardiac
Hemodynamics

A. H. O-Yurvati, DO
Clinical Research &
Education

Michael L. Smith, PhD
Center for Sleep Research

Advisory Board

Lloyd W. Brooks, DO
Fort Worth Heart &
Vascular Institute

John Burke, MD
Sleep Consultants of
Texas, Fort Worth, Texas

Jim Eagle
Trammell Crow
Fort Worth, Texas

Joan Henry
Glaxo-Wellcome
Fort Worth, Texas

Bob Lanier
Fort Worth, Texas

Maria Lowdon
Fort Worth, Texas

Jere Mitchell, MD
UT Southwestern
Medical Center
Dallas, Texas

John Morris
JASAO Corporation
Abilene, Texas

A. H. O-Yurvati, DO
Cardiovascular &
Thoracic Surgery
Fort Worth, Texas

Editorial Staff

Sondra England
Editor

Sleep

Sleep is one of those things we simply cannot live without, even though most of us try to “make do” with as little sleep as possible. Aside from those lifestyle choices that reduce the number of hours we sleep each night, there are sleeping disorders which reduce the effectiveness of our sleep and thus put us at risk for cardiovascular disease, stroke, and other life-threatening events.

Insomnia, Snoring, and Sleep Apnea

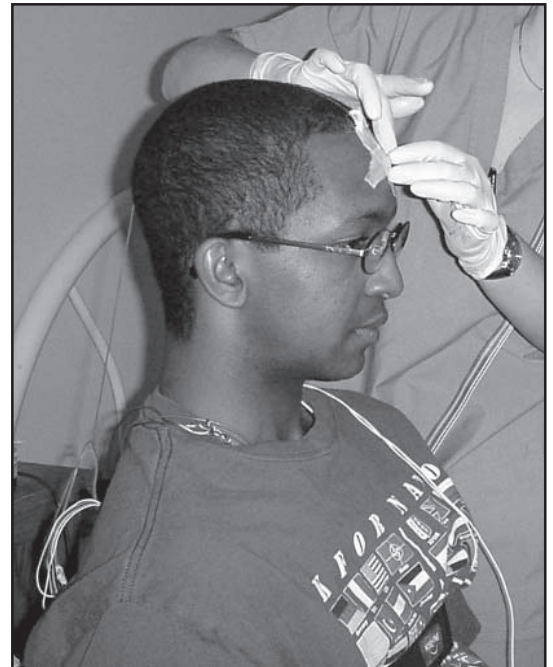
For the most part, everyone experiences insomnia from time to time. Over 50% of the adult population in the US has insomnia at some time during the year and 35% of adults experience insomnia on an occasional basis. For 12% of the adult population, insomnia is a persistent problem.

Insomnia is defined as an inability to fall asleep and stay asleep, awaking several times during the night for no apparent reason. The later can be an indication of sleep apnea. It is believed that 10% of insomniacs are actually suffering from sleep apnea, not insomnia.

Snoring is a rough, inspiratory noise caused by vibration of the pendulous palate (soft palate) and occasionally the vocal cords. Yes, it's funny, it's irritating and often causes alienation of family members; it is also an indication the airway is *not* open. Most of the time, there is no known cause for snoring.

However, too much alcohol or sedation at bedtime can cause snoring. Also, chronic nasal congestion and an obstruction caused by enlarged adenoids and tonsils can cause snoring. Snoring can be a symptom of sleep apnea.

Apnea means “without breath”; a person with sleep apnea stops breathing repeatedly while sleeping, anywhere from 10 seconds to 2 minutes per apneic episode. The breathing events that occur between apneic episodes are



Robert Carter, MS and PhD student at UNTHSC is prepared to participate in a sleep study at Sleep Consultants of Texas.

almost always accompanied by snoring. Sleep apnea can also be characterized by choking sensations.

Many individuals who suffer from sleep apnea may not even be aware they are at risk. “*So what if I wake-up several times a night.*” “*So what if my spouse complains about my snoring.*” There are complex changes in the body when breathing stops; these changes are potentially dangerous:

- decreased oxygen concentration (hypoxemia) in the blood;
- increased CO₂ levels (hypercarbia) in the blood;
- acidosis (an accumulation of acid metabolites which disturb tissue function, specifically that of the central nervous system).

These physiological conditions can cause cardiac dysrhythmias (defective heart rhythm) and pulmonary and systemic hypertension.

Apneic episodes (those seconds or minutes that you are without breath) may occur 20 to 30 times per hour. Sleep apnea is diagnosed when apneic episodes occur more than 10 times per hour of sleep.

Types of Sleep Apnea

There are two recognized types of sleep apnea. *Obstructive sleep apnea* is the most common and severe form. It occurs when the airway closes and remains obstructed. As pressure to breathe increases, the diaphragm and chest muscles work harder. Blood pressure rises and the heart can beat irregularly or even pause for several seconds. The right side of the heart may suffer damage because it must pump harder to support the effort to overcome the incapacity of the lungs. Physical abnormalities are normally the cause of obstructive sleep apnea: excessive pharyngeal tissue, an overly large tongue, a congenitally small airway, or fatty deposits.

Central sleep apnea (CSA) occurs when the brain fails to signal the muscles that help inflate the lungs to contract. The airway is clear, but the diaphragm and chest muscles stop working. Eventually, the decreasing level of oxygen in the blood signals the brain to awaken the individual to voluntarily restart breathing. This type of apnea is more common with age and is associated with heart disease and obstructive sleep apnea. It is believed that CSA may contribute to high blood pressure and irregular heart beats.

How does breathing begin again? During the apneic event, depending on the type of sleep apnea, the brain detects the low level of oxygen in the blood and either signals the upper airway muscles to open (obstructive sleep apnea), or the individual is awakened (central sleep

apnea) and breathing begins again. However, these arousals can prevent restorative, deep sleep.

Diagnosis and Treatment

Often it is not the individual suffering from sleep apnea who is aware of the symptoms. It is a friend or coworker who notices excessive sleepiness at work or while driving. Often a bed-partner is aware of the snoring, difficulty breathing or the nocturnal myoclonus (repetitive twitching or kicking of the lower extremities during sleep) which lead to diagnosis of sleep apnea.

Sleep apnea is not easy to diagnose as compared to other more common illnesses. Diagnosis may require a visit to a pulmonologist, neurologist or other physician with special training in sleeping disorders. Nevertheless, several overnight diagnostic tests are available for evaluating the presence or absence of sleep apnea.

Therapy for sleep apnea is designed for each patient, based on medical history, physical examination, and the results of the tests that have been administered. Medications are generally not effective in the treatment of sleep apnea. Oxygen may benefit certain patients, but it will not cure sleep apnea or prevent daytime sleepiness.

Behavioral changes are important in treatment. Avoid the use of alcohol, tobacco, and sleeping pills which make the airway more likely to collapse during sleep and prolong the apneic episodes. A 10% reduction in body weight can reduce the number of apneic episodes.

Physical or mechanical therapy is very effective. *Continuous positive airway pressure* (CPAP) is the most common treatment for sleep apnea. The patient wears a mask over the nose during sleep and pressure from an air

Sleeping Pills, Alcohol and Sleep Apnea

Sleep Apnea continued

blower forces air through the nasal passages. The air pressure is sufficient to prevent the throat from collapsing during sleep.

There are side effects with CPAP, such as nasal irritation and drying, facial skin irritation, abdominal bloating, mask leaks, sore eyes, and headaches.

For the severe patient, surgery may be required. There are several procedures to increase the size of the airway, however, none of them are completely successful or without risk. In fact, more than one procedure may be required before the patient realizes any benefits. Some of the more common procedures include removal of: adenoids and tonsils, nasal polyps or other growths. Sometimes removal of other tissue in the airway, correction of structural deformities, or removal of excess tissue at the back of the throat may help with breathing in some sleep apnea patients. ♥

The most common sleeping pills prescribed today are benzodiazepines; however, an imidazopyridine — zolpidem (brand name of Albiem) is also often prescribed. These sleeping pills are central nervous system depressants (medicines that cause drowsiness). Taking sleeping pills for insomnia when the real problem is sleep apnea may create a life-threatening situation. Sleeping pills may inhibit your body's ability to restart breathing. Alcohol may cause the same problem.

Another problem with prescription sleeping pills is that they are designed for short term use only. If you abuse them or take them longer than intended, you may experience withdrawal symptoms and sleeping problems more severe than when you began taking the medication.

Normally, the sleep agent in over-the-counter medications is an antihistamine, which can cause rapid changes in heart rate during sleep and carry-over to the next day in the form of drowsiness. Also, individuals who suffer from other medical conditions may have been advised not to take antihistamines. So it is extremely important that consumers read the labels of all over-the-counter medications before taking them. ♥



Robert Carter is ready for his 8-hour sleep

In the sleep study, physiologic responses are measured with the use of EMG to measure muscle activity in the face and legs; EOG to measure eye movement around the eyes and also at the back of the head; EEG to record brain waves; ECG to record heart rate; abdominal band to record inspiratory efforts; respiratory band; pulseoximetry to measure oxygen saturation; and nasal canula to measure nasal pressure.

Research Institute Launches Community Education Program

The Cardiovascular Research Institute is excited to be launching a community outreach program effort (COPE). Two Ph.D. students, Robert Carter and Martin Farias will be working with communities to educate their residents on a variety of better-health topics. The first topic selected for presentation is Sleep Apnea. If you are interested in scheduling a presentation, please contact the Cardiovascular Research Institute Administrative Office at 817.735.5008. There is no charge for the program.

COPE Staff:

Robert Carter, MS	Outreach Lecturer
Martin Farias, MS	Outreach Lecturer
James L. Caffrey, PhD	Faculty Sponsor
Sondra England	Administrative Sponsor

COPE Advisory Members:

John Burk, MD
Sleep Consultants of Texas, Fort Worth;
Adela Gonzalez, MPA
UNTHSC Administrative & Institutional Diversity;
A. H. O-Yurvati, DO
Cardiovascular & Thoracic Surgery, Fort Worth.

CARDIO CARE is a publication of the Cardiovascular Research Institute at the University of North Texas Health Science Center at Fort Worth. Information contained in this publication is educational only and is not intended to replace proper medical evaluation. If you have specific medical questions concerning your personal health, please contact your family physician.



UNIVERSITY of NORTH TEXAS
HEALTH SCIENCE CENTER *at Fort Worth*

★
Education, Research,
Patient Care *and* Service



CARDIOVASCULAR RESEARCH INSTITUTE
3500 Camp Bowie Boulevard
Fort Worth, Texas 76107-2699

cri.hsc.unt.edu